REMARKS

Claims 1-3, 9-17, 24-29 and 32 are pending and await further action on the merits.

Claims 14, 16, 17, 27 and 28 have been withdrawn from consideration as being drawn to non-elected subject matter.

[I] PRIOR ART BASED ISSUES

The following prior art based rejections are pending:

(A) Claims 1-3, 9-12, 15, 24-26, 29 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Highsmith et al. (U.S. Patent 5,682,014) in view of Castagner et al. (U.S. Patent 5,160,163) and Takase et al. (U.S. Patent 4,572,178);

(B) Claims 1-3, 9-12, 15, 24-26, 29 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor et al. (U.S. Patent 5,467,715) in view of Plantif et al. (U.S. Patent 3,964,256), Castagner et al. (U.S. Patent 5,160,163) and Takase et al. (U.S. Patent 4,572,178); and

(C) Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor et al. (U.S. Patent 5,467,715) in view of Plantif et al. (U.S. Patent 3,964,256), Castagner et al. (U.S. Patent 5,160,163), and Takase et al. (U.S. Patent 4,572,178) as applied to claims 1-3, 9-12, 15, 24-26, 29 and 39 above, and further in view of Mitson et al. (U.S. Patent 5,518,054).

Applicants respectfully traverse the rejections.

[I-A] Important Points the Examiner has not addressed:

The Examiner relies upon Castagner and Takase for the notion that it would be obvious to use MnO_2 having a surface area characteristic identical to that presently claimed in the composition of Highsmith. Castagner and Takase describe a specific MnO_2 composition called *Hopcalite*.

However, it is well known to a person skilled in the art that Hopcalite catalyst has to be used in the dry state, because it loses its activity upon exposure to moisture. The Examiner will note that the gas generating agent of Highsmith will generate water.

Furthermore, if the Hopcalite catalyst is incorporated in a gas generating agent, the combustion temperature would be too high to maintain the catalyst activity of Hopcalite. This is the reason it is not appropriate to combine Highsmith with Castagner and Takase.

With respect to the combination of Taylor, Plantif, Castagner and Takase, this combination is improper on technical grounds also. Taylor shows combustion at a low temperature. However, Plantif shows that a high temperature gas, generated by combustion, is used to decompose a coolant, which is separately placed, and to generate O_2. These are opposite goals which counteract one another, therefore, a skilled artisan would not be motivated to combine the references in the manner performed by the Examiner.

Further details of these observations are provided below.

[I-B] The Present Invention is Patentable over the Combination of Highsmith, Castagner and Takase

According to the Examiner's comment in the Office Action, Highsmith discloses a gas generating composition for an inflating air bag. The composition comprises a nitrogen containing fuel such as bitetrazolamine and an oxidizer such as copper oxide. Highsmith mentions a reduction of toxic gases such as CO, however is silent as to the surface area of a metal oxide as catalyst.

Thus, the Examiner relies on Castagner for teaching the use of catalyst such as Hopcalite provided within the air bag for absorbing CO. Further, Takase shows that the Hopcalite includes copper oxide and manganese dioxide with a specific surface area of 217 m^2/g.

Applicants note that the artisan would know that Hopcalite would be deactivated under the wet condition, therefore the gas should be dry beforehand. For example, US 4,317,460 teaches (in col 1, lines 24-31) the following:

> Many of the materials discussed in that report are based on hopcalite, which contains copper oxide and manganese dioxide and is thus an oxidant rather than a catalyst but catalysts such as palladium on molecular sieve were also tested. The report concluded that all the tested materials were unsatisfactory. Thus even at 80°C, hopcalite only removed 60% of the carbon monoxide in the tests described and was deactivated by water... (see Appendix A).

Furthermore, the artisan would know that Hopcalite would be deactivated at high temperatures. For example, US 4,238,460 teaches (in col 2, lines 58-66) the following:

> The waste gas purification unit of this invention is preferably a catalytic oxidation unit, and more preferably, one wherein the catalyst comprises manganese oxide and copper oxide. An especially preferred catalyst is a hopcalite catalyst. When using the preferred hopcalite oxidation catalyst, it is important to maintain temperature of the catalyst during use between about 140 °C. and about 540 °C. Temperatures above about 540 °C. can result in rapid degradation of the catalyst. (See Appendix B).

Thus, it is clear that Hopcalite is moisture and temperature sensitive.

Highsmith uses bitetrazolamine as a fuel, which produces H_2O when it reacts with the oxidizer. Thus, the combustion gas of Highsmith includes H_2O, which would deactivate Hopcalite's ability to reduce the toxic gases.

Furthermore, it could be estimated that the combustion temperature of bitetrazolamine is not less than 540 °C when it is combusted. Based on the teachings of USP 4,238,460, as reproduced above, these high temperatures would cause the Hopcalite to degrade.

Thus, there would be no motivation to include the Hopcalite of Castagner in the gas generant composition of Highsmith as the Examiner alleges in view of the fact that the gas

generant composition of Highsmith produces water and burns at temperatures which would significantly reduce the effectiveness of the Hopcalite.

As a side note, Applicants have discussed at length in previous responses that Castagner teaches the use of Hopcalite in the air bag separate from the gas generant composition and there would be no motivation to take the Hopcalite out of the air bag and combine it with the gas generant composition, as presently claimed. The artisan, with a complete understanding of the heat sensitivity of Hopcalite, would understand that the Hopcalite is placed in the air bag, since the combustion gas discharged in the air bag would be reduced in temperature due to adiabatic expansion. Accordingly, to move the Hopcalite from the air bag to the gas generant composition (as the Examiner alleges would be obvious) is counterintuitive.

For the reasons stated above, the combination of Highsmith with Castagner and Takase does not motivate the artisan to prepare the instant gas generant composition containing manganese oxide because of the Highsmith's composition would produce H_2O and high combustion temperatures which are deleterious to the performance of Hopcalite. Therefore, it is not appropriate to combine Highsmith with Castagner and Takase, because the combination is not obvious.

[I-C] The Present Invention is Patentable over the Combination of Taylor, Plantif, Castagner and Takase

For the similar reasons stated above, the artisan would not be motivated to use the Hopcalite of Castagner in the gas generant composition of Taylor, as presently claimed.

Further, the Examiner states at page 4, first paragraph of the outstanding Office Action that:

> Plantif et al. teaches gas generating composition that use various additives to decrease toxic gases such as CO. Plantif teaches that manganese dioxide lowers the decomposition temperature.

Applicants have carefully considered the teachings of Plantif et al. and believe that the Examiner's comments are based on a misunderstanding.

A careful review has realized that the statement of Plantif in col. 2, line 15 to col. 3, line 11 teaches that the manganese dioxide is used in the coolant and is not used as part of the gas generant composition as presently claimed. The Examiner will note that none of the Examples use manganese dioxide (or iron oxide or copper oxide for that matter) in the gas generant composition.

Plantif's mechanism is that the combustion gas generated in a high temperature is cooled down by passing the combustion gas through the coolant for generating O_2. In order to decompose the coolant and generate O_2, the propellant should be combusted at a high temperature.

To the contrary, Taylor states that the fuel component and oxidizers are selected to achieve a low combustion temperature, so as to minimize production of toxic oxides during combustion. The combustion itself should be conducted at a lower temperature, which is distinct from cooling the already combusted gas (which was combusted at a high temperature). Therefore, Taylor's mechanism is quite different from (opposite to) Plantif's one.

Therefore, Applicant believes that there is no motivation to combine and the combination suggested by the examiner is not appropriate.

Based on the foregoing, the presently claimed invention is not made obvious by the cited references in any combination, and as such, withdrawal of the rejections is respectfully requested.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Garth M. Dahlen, Ph.D., Esq. Reg. No. 43,575 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

Dated: November 21, 2006

Respectfully submitted,

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Attachments: 1) Appendix A: US 4,317,460 (up to and including Col. 2)
2) Appendix B: US 4,238,460 (up to and including Col. 2)